Laboratory Equipment Manufacturer
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Operation Manual for

Fat Analyzer

FA-46

PLEASE READ THIS MANUAL CAREFULLY BEFORE OPERATION

3, Hagavish st. Israel 58817 Tel: 972 3 5595252, Fax: 972 3 5594529 mrc@mrclab.com

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Contents

 Warning: The instrument can not provide the designed protection for operators who do not follow the right procedures and requirements given by the manufacturer.

 Warning: All solutions must be handled with care according to the lab's safety regulation. Please make a reference to the related material safety data sheet. Wear the lab-gown, goggle and rubber gloves all the time. Be care of hot reagents.

 Warning: Be aware of the risk of electric shock. Only the trained professionals are permitted to open the face panel or back cover.

I. Summary

1. Application

FA-46 Fat Analyzer, designed in accordance with GB/T 14772-2008, can be used not only in measuring the fat content in food, diary product and feedstuff, but also in testing the soluble organic compound in detergent, medicine, petrochemicals, fiber products, soil and sewage etc.

For example:

(1). To test the fat content in the food, feedstuff, grain, and seed.

(2). To extract the fat from the sewage and mud.

(3). To extract the semi-volatile organic compound such as pesticide and weedicide.

(4).To extract plasticiser from plastics; to extract colophony from the paper; to extract grease from the leather.

(5).To perform the pre-digestion process to the solid samples for the Gas chromatography (GC) or Liquid chromatography (LC).

2. Principle

Based on the principle of Soxhlet extraction, FA-46 uses the weighing method to obtain the fat content. After being extracted from the sample by solvents such as absolute ether or petroleum ether, the fat is dried and weighed. The difference between the vessel's weights before and after the extraction is the fat content.

II. Main Specificaiton

1. Technical specification

(1). Wide temperature controlling range:

Room temperature: +5~280 ℃; Accuracy: ±1 ℃

(2). Heating power: 1000 W

(3). Operation voltage: 220V

(4). Frequency: 50/60 Hz

(5). As many as six samples can be tested at the same time.

(6). Volume of solvent vessel: 80 ml;

Sample amount: 0.5~15 g (regular amount: 2~5 g)

(7). Solvent recovery rate: ≥80%

(8). Testing scope: 0~100%

(9). Dimension (mm): 650×320×700

(10). Weight: 35 Kg

2. Features:

(1).5.1 inch LCD and controlling system with microprocessor

(2).Overheating warning and alarm function are available.

(3).The audible, visual warning signals as well as the reminding messages on the screen are used in the alarming system.

(4).Both timing and time recording functions are available.

(5).The all-in-one metal heating block is utilized to achieve the wide temperature controlling range with the high controlling accuracy.

(6).The elevation connection using the transmission technique of the linear bearing brings the flexible elevating operation.

(7).All information can be clearly displayed on the screen. The preset temperature, actual temperature and heating time can be displayed simultaneously on the screen.

(8).The safe operation is ensured because the electric circuit is completely isolated with the extraction cell.

(9).With the unique air space insulation technique, the temperature of instrument's case can be kept normal.

(10). Compared with the traditional soxhlet extraction, its speed and efficiency are better.

3. Working Condition

(1). Input voltage: 220V 50Hz；air break switch and leakage circuit breaker are required.

(2). The apparatus should be placed where water, drain basin, electric pocket are available.

(3). Power supply should meet the requirements of the apparatus to avoid electric over stress; independent switch, safety device and reliable grounding are required.

(4). The apparatus should be placed away from big electric equipment to avoid strong magnetic field.

(5). Ensure the good ventilation of the laboratory.

III. Structure

Components

1.Gliding balls 2. Condenser pipe 3. Cock 4. Extraction cups
5. Lever 6. Socket 7. Power switch

IV. Installation

1. Check before Installation

After the analyzer is unpacked, check the analyzer and all the parts specified in the manual and check if there are any damages. If so, please contact the manufacturer in time (please keep the damaged parts).

2. Conditions for Installation

(1). This analyzer should be placed away from direct sunshine, moisture, heat and coldness,Generally room temperature should be kept between 10 ℃ ~ 28 ℃.

(2). This analyzer should be placed near water source and sinks, and electric socket should be available at the site. The distance between the instrument and water tap (or the power socket) should not be over 1 meter to ensure convenience of operation. The water should meet the following requirements: water flow 1-2 liter per minute, adequate water pressure and temperature no more than 20 ℃.

(3). The sink should be at least 10cm lower than the water outlet of the instrument to ensure free flow of the water.

(4). The power supply should meet the requirement. Ground line, separate power switch and right fuse are necessary to make sure the safety of the operators.

(5). This analyzer should be installed at the place where there is no big electrical equipment nearby and the working place should be free of vibration, corrosive liquid and interference from strong electromagnetic field.

3. Procedures of Installation

Put the analyzer at test table stably. The back of it should be 20 centimeters away from the wall, and the socket should not be more than 1 meter away from the analyzer. Air switch, leakage switch, and reliable ground line should be equipped. See figure 1.

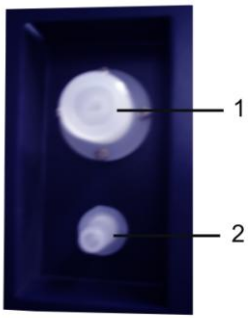

Figure 1

(1). Condensate inlet (connect to the water tap)

(2). Condensate outlet (connect to the sink)

V. Operation

1. Reagent, equipment and tools

(1). Ether (analytical pure), petroleum ether (analytical pure, boiling range 30~60 ℃)

(2). Analytical balance (0.0001g)

(3). Filter paper with diameter of 90mm

(4).Graduated cylinder (100ml)

(5). Drying oven

(6). Grinder

(7). Mortar and pestle

(8). Desiccator

2. Pre-processing of Sample

2.1 Pre-processing of Food Sample

2.1.1 Solid sample: Get at least 200g of typical sample. Mash and mix the sample well, and put it into the closed glass vessel; for those that are not easy to mash, cut them into small granules and then put them into the closed glass vessel through a circular sieve (holes 1.0 mm in diameter).

2.1.2 Powder sample: get at least 200g of typical sample(the powder should be mashed well if particles of the powder are big). Mix well, and then put into glass vessel through a circular sieve (holes 1.0 mm in diameter).

2.1.3 Paste sample: get at least 200g of typical sample, mix well, and put into glass vessel.

2.1.4 Solid and liquid sample: get at least 200g of typical sample according to

the proportion between solid and liquid, and then mash the sample.

2.1.5 Meat product: Remove the part that is not eatable. Get at least 200g of typical sample. Grind the sample at least two times. Mix the grinded sample well and then put them into the glass vessel.

2.2 Pre-processing of feedstuff

2.2.1 If the sample is broken or the fat content is low, refer to 2.1 Pre-processing of food sample

2.2.2 If the sample is unbreakable or the fat content is high (over 200g/kg), it have to be extracted in advance.

3. Operation

(1). Refer to figure 2 for the operation panel.

Figure 2

(2). Switch on the analyzer and it will show the initial interface (figure 3).

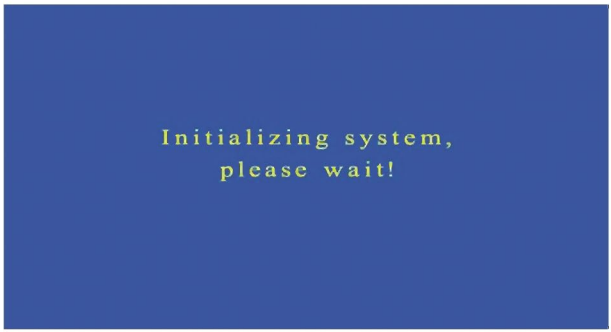

Figure 3

The operation interface will be shown in 2 seconds (figure 4).

Figure 4

(3).Set temperature and time: press【Enter】on the operation panel to enter the operation interface (figure 5).

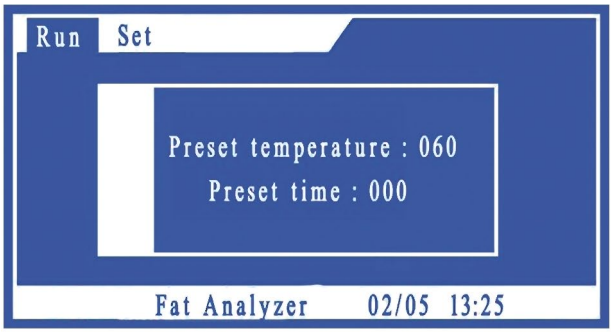

Figure 5

Set up the temperature (℃) and time (min) and press【Enter】to start heating. If there is no time input, the instrument will keep heating up until the preset temperature is reached and maintain the temperature. The heating interface is shown in figure 6.

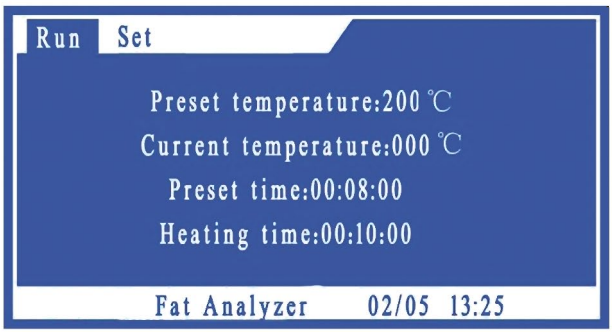

Figure 6

When the preset time is over, the following interface will be shown (figure 7). The alarm lamp will light up and the alarm buzzer will buzz at the same time to give a remind.

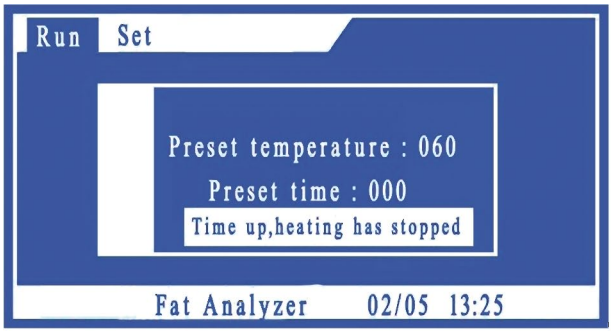

Figure 7

(4). Set up the system time: after the initialization, press  move the cursor to “Setup”. Press 【Enter】and the “Setup” interface will be shown (figure 8).

Figure 8

Put in the right date and time and press【Enter】, thus finishing the setup of the system time.

Besides, the heating process can be stopped by pressing 【Pause】(figure 9). Press 【Pause】again and the heating process will resume. When the temperature of the heating plate exceeds the preset temperature by 30℃, the alarm lamp will light up and the alarm buzzer will buzz. An emergent interface will also be shown (figure 10). Press【Stop】and the heating will stop (figure 11).

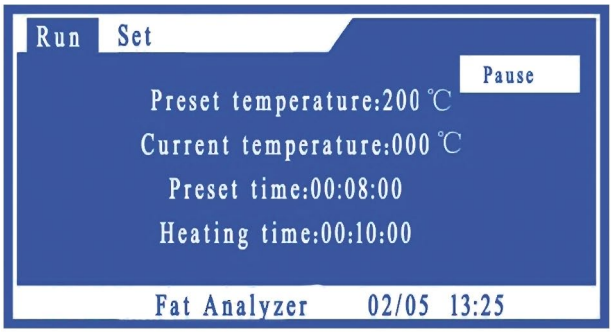

Figure 9

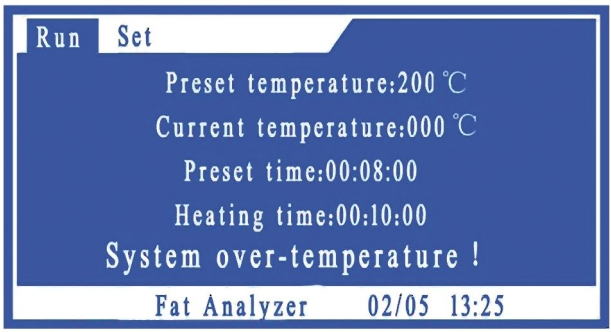

Figure 10

(5). Press【Menu】and the system will go back to the operation interface (figure 4).

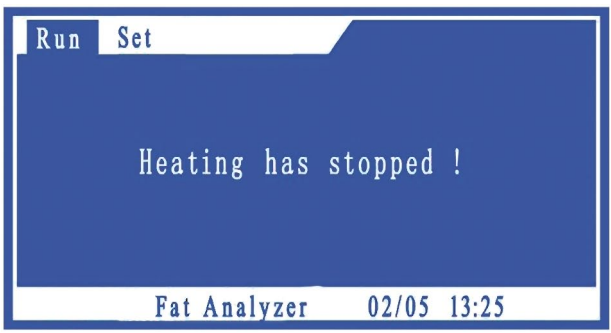

Figure 11

4. Experiment Procedures

(1). Make one extraction thimble with filter paper (use the paper rod attached). Measure 2-5g sample with the analytical balance (to the nearest 0.0001g) and put the sample in the thimble. Put the thimble in the holder, which will be attached to the instrument by magnet.

(2). Dry a constant weight extraction cup and measure its weight. Put 60ml Petroleum ether or absolute ether in the cup and put it on the heating plate.

(3). Push down the lever to seal the extraction cup with the joint washer. Move the gliding ball to put the thimble in the cup and make sure that the sample is fully in the solvent.

(4). Turn on the power and open the condensate. Set up the temperature and time.

(5). After a while, move the gliding ball to lift up the thimble and start the extraction. When the extraction is completed, close the cock on the condensate pipe and the solvent will be evaporated, condensed at the condenser, and collected in the empty extraction chamber under the condensate pipe. Then open the cock and start the rinsing process, during which the condensed solvent washes final traces of fat from the sample. In the end, close the cock and the solvent will be condensed and collected in the extraction. Stop heating.

(6). Cool the heating plate and extraction cup. Pull up the lever and open the cock. Get the solvent in the extraction chamber.

(7). Remove the extraction cup from the heating plate and put it in the drying oven. Then put the cup in the desiccator to cool down. Measure the weight of the cup and work out the percentage of the fat content.

(8). Turn off the power and condensate.

VI. Problems and Troubleshooting

No.	Problem	Possible Reason	Trouble Shooting
1	No power	The fuse burned Bad connection of power cord	Replace the fuse Plug the power cord again
2	Solvent Gas leakage	1.Insufficient condensate 2.The rubber ring at the end of the condensate pipe is old and can not seal the pipe tightly 3.The condensate pipe is broken	Put in more condensate Replace the rubber ring Replace the condensate pipe
3	System failure or crash	Check if there is any strong magnetic field or electronic field around	Turn off the instrument,move away the source of disturbance and reboot the system

VII. Maintenance

1. The analyzer needs heating up, so good ventilation and heat dissipation are necessary.
2. It is recommended that in the certain period, the same extraction system should use the same solvent to prevent cross-contamination between different solvents.
3. Clean the instrument with a wet cloth to avoid static electricity; clean the heating plate with an abrasive cloth to improve heat transmission.
4. Keep the receiving flasks and extraction containers clean. Clean them

regularly.
5. Make sure that there is no seaweed growing in the cooler. If there is, clean the cooler with hydrochloric acid or hypochlorous acid (1 mol/L).

VIII. Caution

1. Read the manual carefully and follow the instructions. The instrument must not be operated by any green hand.
2. The instrument must be cleaned with a wet cloth, especially the glass wares. A dry one may generate static electricity and cause danger.
3. The maintenance must follow the instructions strictly. Necessary replacement of glass wares, parts and wires can be done under the instruction of the professtional engineers. But other repair work must be done by the professtional engineers.
4. We does not guarantee safety after any unauthorized alteration is done to the instrument. Therefore, we does not take responsibility for any loss thereafter.
5. Cut off the power before opening the instrument and replacing the fuse pipe.
6. Handle with care. There are some glass wares in the instrument.
7. If the instrument will not be used for a long time, remove the solvent in the condensate pipes.
8. It is recommended that in the certain period, the same extraction system should use the same solvent to prevent cross-contamination between different solvents.
9. Mismanagement of organic solvent may cause explosion, so keep the

organic solvent away from fire and static electricity.

10. Don’t touch the instrument when it’s heating up.

11. Don’t leave the instrument in experiment unattended.

IX. Appendix

This product is covered by the one-year limited warranty since the day of purchase. The limited warranty does not cover the following situations:

1. The warranty expired.
2. The instrument is damaged by any inappropriate use.
3. The instrument is damaged by any unauthorized disassembly.
4. The instrument is damage by any improper storage.

X. Reference for Temperature Value

The heating temperature should be adjusted according to the room temperature and the heat transmission efficiency from the heating plate to the extraction cups. The dipping rate will be about 3-5dips/ second in proper temperature. The following chart can be referred to for the extraction temperature of some common organic solvents.

Solvent	Extraction Temperature (℃)
30-60 ℃ Petroleum ether	80
Ether	60
Acetone	76
methylene dichloride	60
Hexane	89
Methanol	85
Ethanol	98
chloroform	82
benzene	100

※**Attention**: for the organic solvent not listed above, the extraction temperature can be 20℃ higher than the boiling point.